17. OPPORTUNITIES FOR PHILIPPINE SMALL-SCALE FORESTRY IN CARBON MARKETS: INITIAL NOTES

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This paper introduces a research project intended to evaluate the capacity of landowners in the Philippines to engage in small-scale carbon forestry projects and participate in international environmental markets, specifically through the clean development mechanism (CDM) or other similar schemes in regulated or voluntary markets. The paper discusses relevant policy mechanisms, presents a review of current literature, and then describes the structure of the research project that will be conducted in the study area of Leyte, the Philippines. The research project will apply a systems methodology which is explained in this introductory paper. The literature review provides initial assumptions that will be applied in this systems methodology.

INTRODUCTION

This paper introduces a research project that will gauge the potential for small-scale tree farmers in developing countries to engage with emerging global carbon markets through policy mechanisms such as the clean development mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC) or the Voluntary Carbon Standard (VCS). The paper describes the international carbon market policy instruments and discusses constraints and opportunities for participation in these markets by small-scale land managers (tree farmers, agro-foresters) in the Philippines. The paper then explains the Bayesian network model which will be used to describe the existing system (of small-scale silviculture and agro-forestry in Leyte) and provide data for further analysis with the goal of determining appropriate intervention actions to facilitate the engagement of small-scale landholders with international carbon markets.

Land cover change in the form of deforestation and degradation is a major contributor to global GHG emissions. There are considerable uncertainties in measurement, yet land use, land use change and forestry (LULUCF) is estimated to account for anywhere between 12% and 28% of the global emissions inventory (IPCC 2007). The inclusion of LULUCF in international agreements is also seen as a means of encouraging ‘climate friendly’ land use and participation by all countries in sustainable development, particularly in developing countries (Cowie 2007). Afforestation and reforestation projects are one of a suite of approaches intended to address the challenge of climate change (Pacala 2004).

The policy framework that has evolved to address the challenges posed by climate change has established carbon as the standard of exchange in a market designed to achieve specific outcomes: reduction of greenhouse gas (GHG) emissions and sustainable development. The inclusion (in the Kyoto Protocol) of land use, land use change and forestry (LULUCF) in national emissions accounting has meant that agriculture, forestry and deforestation are integral components of carbon inventories, yet there has been little success in using the LULUCF sector to achieve the goals of the UNFCCC (Schlamadinger and Johns 2007). Other mechanisms beyond the Protocol continue to be negotiated.

The purpose of the research project will be to describe and assess the nature of existing tree farming activities in the Philippines in the context of international carbon market processes. This will allow for the identification of constraints, gaps and potential leverage points in the system resulting from the interaction and combination of these data. This information has the potential to facilitate the engagement of small-scale land managers in developing countries with the global climate policy instruments and economy.

This paper presents a general background to relevant international policy instruments including the clean development mechanism (CDM) and Reduced Emissions from Deforestation and Degradation (REDD). The paper then outlines the research methodology which will be applied in this project, as well as the expected outcomes of the project. This paper is therefore an introduction to the research topic – essentially a literature review – and a description of the research methodology that will be used.

INTERNATIONAL REGULATORY FRAMEWORKS

The expansion of emission trading schemes during the last two decades represents an attempt to use market forces to combat problems (i.e. global warming resulting from human industrial activity and land use) largely arising from market processes and the results of commercial activity. Climate change itself has been described as a market failure, in that those responsible for the activities which cause climate change and impose 'costs on the world and on future generations' do not bear any of these costs, financially or otherwise (Stern 2006, p. 24). Environmental markets designed to mitigate climate change are being developed on national and global scales, and include the European Union's Emissions Trading Scheme (EU ETS) and the Chicago Climate Exchange (CCX). National governments in the United States, Japan and Australia continue their attempts to implement cap-and-trade schemes. China has recently suggested it is considering introducing a domestic trading mechanism to achieve emission reductions.

Aside from emissions trading between states, the Kyoto Protocol mechanisms for emissions management include the clean development mechanism (CDM) and joint implementation (JI), both being project-based systems. The CDM operates between entities in industrialised states (which have Kyoto obligations described in Annex B) and parties in developing (non-Annex 1) countries. Joint implementation is similar to the CDM in scope but operates between firms in developed economies.

The CDM is the largest source of offset credits to firms in industrialised economies, and in the context of regulated markets a likely vehicle for project development in the Philippines. Another important evolving policy mechanism is Reduced Emissions from Deforestation and Degradation in developing countries (REDD). There are continuing efforts to enact formal recognition of outcomes beyond emissions reduction, including biodiversity protection and ecological services. Beyond the regulated markets, there are also voluntary markets which recognise carbon credits. The major regulatory market systems, the CDM and REDD, are discussed in further detail below.

The Clean Development Mechanism (CDM)

The CDM is a regulatory instrument that integrates commercial activities in host countries with corporate buyers of offsets in industrialised nations. CDM projects reduce, avoid, destroy or sequester greenhouse gas (GHG) emissions within the operational parameters of registered methodologies in a range of sectoral scopes, including energy production and distribution, mining, waste management, agriculture and forestry. Reductions must be additional to business-as-usual (BAU) scenarios, and are required to be measured, verified and reported by accredited independent organisations. The certified emission reductions (CERs) generated by CDM projects are measured in metric tons of carbon dioxide

equivalent (tCO2e) and function as international credits: they are tradable commodities and can be purchased by firms in Annex 1 countries for use in 'cap-and-trade' compliance schemes such as the European Union Emissions Trading Scheme (EU ETS) and the New Zealand Emissions Trading Scheme (NZ ETS). Firms are able to surrender CERs (and other types of international units) as offsets of their verified emissions, within the constraints of particular domestic legislative frameworks (UNFCCC 2010).

CDM projects can be developed in any of 15 sectoral scopes, ranging from energy production (renewable and non-renewable) to agriculture. Forestry is one of these sectoral scopes, and CDM projects can generate CERs through afforestation or reforestation (of areas cleared prior to 1990) (UNFCCC 2009). Despite the importance of the CDM, however, CERs generated by forestry projects are excluded from the world's largest compliance market, the European Union Emission Trading Scheme. This exclusion may have contributed to the fact that notwithstanding efforts to encourage afforestation and reforestation project activities, they currently represent less than 1% of all projects in the CDM pipeline. There were only 16 registered projects as of June 2010. While there are numerous constraints which affect the development of forestry-related CDM projects, it is clear that the sector is under-represented. LUCC is also not addressed in the agricultural scope. There are 127 projects registered using agricultural methodologies. Most of these projects involve methane capture and recovery or animal waste management, with a minority generating emission reductions through biomass-based power generation (UNEP 2010). It can be reasonably stated that land use, land use change and forestry play a negligible role in the CDM, which is the principal source of emission offsets in the global carbon market.

The CDM is the principal source of carbon emissions offsets for firms in developed countries, with more than 2600 registered projects as at the end of June 2009, about 4000 more in the CDM 'pipeline' (UNEP 2010), and more than US$6.5 billion in project-based transactions in 2008. The CDM contributed 84% of the emission reductions generated in primary, project-based activities, which accounted for 90% of the US$6.5 billion spent in purchasing CERs (Capoor and Ambrosi 2009).

The paucity of forestry-based activities is anomalous because these activities offer many economic, social and environmental benefits. The impacts of LULUCF projects extend beyond genuine emissions reductions to include a host of vital ecosystems services such including the provision of habitat and thus protection of biodiversity, production of food, regulation of local climate and disease vectors, nutrient cycling and pollination. LULUCF projects can be effective carbon sinks.

Analysis of registered CDM afforestation and reforestation (A/R) projects suggests that 'successful' applications are likely to have initial funding support, the guidance of large organizations with technical expertise, occur on private land (land with secured property rights attached), and direct most CER revenue back to local communities (Thomas et al. 2010a).

Figure 1 illustrates the stages of the CDM process. The model describes the CDM supply chain and identifies key points in the system.

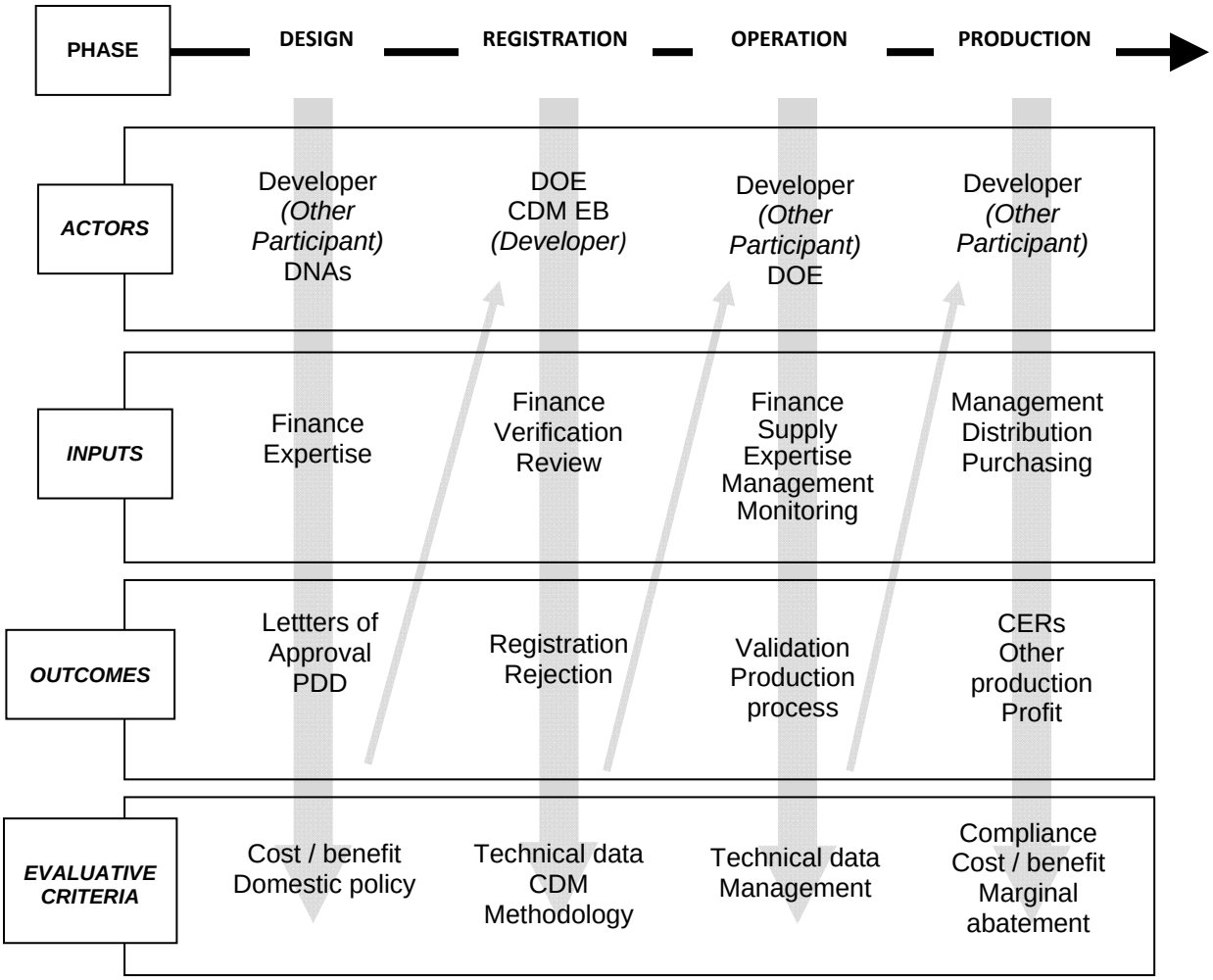

Figure 1. The CDM process

Reduced Emissions from Deforestation and Degradation in Developing Countries (REDD)

It is believed that forestry-based projects have the greatest potential in developing countries due to the higher growth rates of tropical habitats, the availability of land, synergies with the need for future biomass, and the fact that the land-use sector is the main option for participation in the CDM by developing countries (Schlamadinger and Johns 2007). Small-scale forestry is increasing in both developed and developing countries (Zhang 2009), and is seen as having the potential, with effective management, to operate as a net sink for carbon (Masera 1997; Parks 1997; Pearce 2003; Palm 2009). Mechanisms that seek to reduce emissions from deforestation and forest degradation (REDD), particularly in tropical countries where forest carbon pools are largest (FAO 2006), are therefore financially attractive. Yet while these approaches have generally been considered as cost-effective methods of achieving emission reductions (Stern 2006; Strassburg et al. 2009), it is increasingly clear that the complexities inherent in such schemes render REDD and other mechanisms of payment for environmental services (PES) extremely difficult to implement.

REDD mechanisms offer a range of desirable ancillary benefits including the provision of habitat, production of food, regulation of local climate and disease vectors, and nutrient cycling and pollination. At the same time, REDD and other land-use-based carbon management systems can contribute to building the adaptive capacities of communities

affected by the impacts of climate change, by mitigating salination and erosion, protecting against extreme weather events, and providing biodiversity protection and ecosystem services into the future. Simply put, management of land use and land cover in the context of carbon markets represents a comprehensive response to climate change and an integrated approach to achieving sustainable development (Thomas et al. 2010b).

Reduced Emissions from Deforestation and Degradation Plus (REDD+) schemes are essentially international payments for ecosystem services (PES). In a global greenhouse gas emissions reduction framework, the ecosystem service provided is carbon storage, though there are also arguments to include carbon sequestration in forests as well (one of the many 'plus' benefits). The service is to be measured as the difference between emissions under a projected 'business as usual' baseline, and actual measured emissions with the project. The consensus of current proposals would restrict payments to developing countries, from developed countries, either as a voluntary payment or with the potential to generate carbon offsets for national carbon accounting or compliance markets (Parker et al. 2009).

International discussions on REDD policy mechanisms have continued since the Kyoto Protocol was signed. At the 13th Conference of Parties (COP13) in Bali a number of countries advocated the inclusion of conservation activities in a REDD mechanism, but this was opposed by powerful players including the European Union and Brazil because they feared such inclusions would create large amounts of 'hot air' credits and effectively flood the carbon market, removing incentives for further conservation elsewhere. The uncertainty over the exact determination of eligible activities remains unresolved, although there was general agreement at COP15 in Copenhagen that REDD mechanisms should be further developed to include ancillary benefits under the rubric of 'REDD+'.

The technical challenges of REDD are the same that confront forestry-based activities in the CDM. These include the determination of baselines (meaning decisions on how to calculate business-as-usual emissions and the additionality of reductions), the question of permanence, leakage (transferral of emissions from a project site to other areas beyond the project boundary), and importantly, the challenges of monitoring and verification (through satellite observation or sampling approaches).

A second intractable issue is the question of funding for REDD, which derives either from public funds or market mechanisms (Skutsch and McCall 2010). Different countries support different approaches, ranging from taxes and levies on JI transactions to international-level financing through the World Bank and governments, yet the funds that have been established have as yet failed to secure major investment, with total commitments and contributions not more than US$1 billion to date (Hamilton et al. 2010; World Bank 2009). This suggests that regulated markets may be far more effective in funding REDD-type mechanisms than voluntary systems.

A key feature of market mechanisms is that they create incentives, drive innovation and are important for the distribution of goods and services. These quantity-based approaches devolve management to entities competing in the market arena. In contrast, price-based instruments involving 'top-down' regulation through taxation or tariffs require centralised bureaucratic administration and are thus more unwieldy and difficult to enforce. No international authority capable of imposing such a fiscal regime exists at this time. It is imperative to develop policy approaches that can overcome the technical and institutional constraints on REDD, and market mechanisms are the most efficient tools to achieve these outcomes.

CONSTRAINTS AND OPPORTUNITIES: THE LEYTE CASE STUDY

There are considerable constraints to the development of forestry-based offset projects, and the likelihood that areas of land will be utilized in project activities is dependent on a range of social and economic issues, food security and other factors (Zomer et al. 2008). Despite the appeal of REDD and other PES mechanisms, the lack of actual regulatory frameworks to date is indicative of the challenges faced by policy-makers. The constraints on the development of LULUCF activities can be broadly characterised as financial constraints, technical issues and institutional challenges.

Initial impressions of Leyte suggest that the four features of successful forestry projects described previously (initial funding support, the guidance of large organisations, secure land tenure, revenue returning to communities) are plausible outcomes for projects in the Philippines. There is a well-organised community structure, private land management and a history of participation in international programs.

Financial constraints, particularly from the landholders' perspective, are clearly a fundamental issue. Constraints associated with proponents' lack of the technical knowledge and skills required to successfully manage the complex administrative and governance aspects of project development may be managed through appropriate training and project design. These must be evaluated in the context of the national regulatory system.

Beginning with a case study of small-scale tree farmers and agro-foresters in the Philippines, the research project will seek to determine the most cost-effective and equitable carbon production and marketing systems to facilitate access by forest carbon offset producers in Leyte with emission trading systems and clean development projects. This analysis should be relevant to small-scale landholders in similar developing country contexts.

The research project described in this paper will be conducted within the following format:

1. Understand existing practices, networks and income streams of potential forest carbon offset producers
2. Identify constraints on and requirements for participation in international carbon markets
3. Create a model of the existing system (which can be verified by relevant stakeholders) including controlling factors, intermediate factors and implementation factors
4. Format the systems model as a Bayesian network using Netica software
5. Identify leverage points in the system
6. Generate and test potential interventions

The research project will collect data that will be structured and evaluated using a systems approach. This methodology recognises the complexity and diversity of influential variables which are incorporated into a Bayesian Network (Cain 2001). Table 1 describes the initial structure of the Bayesian model that will be applied to structure and analyse data gathered in the research. The table presents assumptions based on the preliminary literature review presented in this paper. These network components will be verified through interviews and discussions with local stakeholders and experts in the Philippines as part of the data collection in for the research project.

Controlling factors are by definition external or beyond the influence of small-scale operators (SSOs). Further data will be collected in regard to intermediate and implementation factors specific to small-scale landholders in Leyte.

Table 1. Bayesian network components

Category	Description	Examples
Objectives	Capacity to engage	Tree farmers receiving income from sale of carbon offset credits in regulated or voluntary international markets.
Interventions		
Intermediate factors	Physical management costs Profitability of carbon forestry Production systems	Tree growing costs Yield Timber harvesting Agro-forestry
Controlling factors	Carbon price Transaction costs Regulatory frameworks Biophysical factors	Forest definitions Validation Registration Physical risk Permanence
Implementation factors	Awareness and knowledge Start-up capital Monitoring, reporting and verification (MRV)	
Additional impacts	Ecosystem services Biophysical impacts Social development	

Intermediate factors include the discrete cost components of physical management, variations in cost, and the ability of landholders to influence operating costs. A second issue is profitability, which is affected by a range of considerations and operators have varying capacities to influence these. The flexibility of existing production systems and the ability of operators to interact and pool resources can contribute to the capacity of individuals to engage with carbon markets, and the likelihood of collaboration must therefore be included in the system model.

Implementation factors include awareness and knowledge of the concepts of climate change, carbon sequestration and offsetting, as well as the ability to gain and share new knowledge through informational and communication tools and practices.

Access to capital for new investment or ventures through public finance or investment is critical for project development. To what extent could operators cooperate in managing shared investment capital?

Because monitoring, reporting and verification (MRV) are integral and often difficult components of (for example) CDM project operation, it is important to understand the existing approach to monitoring and record keeping. It may be necessary to provide training in specific skill areas to facilitate MRV, or there may be existing practices which can be adapted.

CONCLUSION

The key goal of the research project described in this introductory paper is the creation of a systems model that integrates policy structures, supply chain characteristics and socio-economic data. The model will be a Bayesian network developed with Netica software. Analysis of the model should allow for scenario generation and the identification of useful strategies or reforms.

There is a range of existing market mechanisms, voluntary and regulated, and increasing market opportunities, for land-based carbon management projects. While opportunities through the CDM, REDD, REDD+ and the Voluntary Carbon Standard (VCS) involve different application pathways and management characteristics, they face common challenges and can respond to related policy interventions. The model developed in the research project described here should be applicable in other contexts beyond the initial project study site. Should small-scale carbon forestry projects commence, this systems approach will contribute to ongoing management, as well as research and development.

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